

AIR BAG DEPLOYMENT ARRANGEMENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 The invention relates to an air bag deployment arrangement for a vehicle seat.

2. Background Art

Motor vehicle seats may be provided with an inflatable air bag that deploys through a trim cover. Examples of such seats are disclosed in U.S. Patent Nos. 6,045,151 and 6,237,934.

10 SUMMARY OF THE INVENTION

An assembly according to the invention for use with a vehicle seat includes an air bag module having an inflatable air bag, and a trim cover that covers at least a portion of the air bag module. The trim cover further has a deployment seam for allowing the air bag to deploy through the trim cover. In addition, the
15 assembly includes an air bag deployment member that substantially circumscribes the air bag module. The deployment member is connected to the trim cover on only one side of the deployment seam.

Further under the invention, a vehicle seat cushion assembly includes a frame and an air bag module supported by the frame. The air bag module includes
20 an inflatable air bag, and an inflator for inflating the air bag. A trim cover covers at least a portion of the air bag module, and the trim cover has a deployment seam for allowing the air bag to deploy through the trim cover. The assembly further includes an air bag deployment band for guiding deployment of the air bag. The deployment band substantially circumscribes the air bag module and has first and

second ends. The first end is connected to the trim cover on one side of the deployment seam, and the second end is connected to a portion of the deployment band proximate the first end.

5 Still further under the invention, an assembly for a vehicle seat includes an air bag module including an inflatable air bag, and a trim cover that covers at least a portion of the air bag module. The assembly further includes an air bag deployment device for guiding deployment of the air bag, and the deployment device has first and second sections. The first section is connected to the trim cover and extends toward a first side of the air bag module. The second
10 section is connected to the first section at a location proximate the trim cover and extends toward a second side of the air bag module.

While exemplary cushion assemblies in accordance with the invention are illustrated and disclosed, such disclosure should not be construed to limit the
15 claims. It is anticipated that various modifications and alternative designs may be made without departing from the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a perspective view of a vehicle seat according to the invention;

20 FIGURE 2a is a cross-sectional view of the vehicle seat taken along line 2-2 in Figure 1;

FIGURE 2b is an enlarged view of a portion of Figure 2a;

FIGURE 3a is a cross-sectional view similar to Figure 2a of a second
25 embodiment of a vehicle seat according to the invention; and

FIGURE 3b is an enlarged view of a portion of Figure 3a.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Figure 1 shows a vehicle seat 10 according to the invention mounted in a motor vehicle 12. The seat 10 includes a lower seat cushion assembly 14 and a seat back cushion assembly 16 attached to the lower seat cushion assembly 14, such as by one or more recliner mechanisms.

Referring to Figures 1 and 2a, the seat back cushion assembly 16 includes a seat back frame 18, an air bag module 20 supported by the frame 18, and padding 22 such as foam disposed adjacent the frame 18 and/or air bag module 20. While the air bag module 20 may have any suitable configuration, in the embodiment shown in Figure 2a, the air bag module 20 includes an inflatable air bag 24, an inflator 26 connected to the air bag 24 for inflating the air bag 24, and a housing 28 that receives the inflator 26. The air bag module 20 may also include a covering member 30, such as fabric or plastic, that at least partially covers the air bag 24 to retain the air bag 24 in a folded condition. Moreover, the inflator 26 and/or housing 28 may be connected to the frame 18 and/or a bracket (not shown) in any suitable manner, such as with one or more fasteners 32.

As another example, the housing 28 may be configured to substantially enclose the air bag 24 and inflator 26. For instance, the housing 28 may have a clam-shell body that surrounds the air bag 24 and inflator 26, and that is configured to open upon inflation of the air bag 24.

The seat back cushion assembly 16 further includes a trim cover 34 that covers at least a portion of the air bag module 20 and that defines an appearance surface 36 of the seat back cushion assembly 16. The trim cover 34 may comprise any suitable cover material, such as fabric, vinyl and/or leather, and may also include a padding layer attached to the cover material. Furthermore, in the embodiment shown in Figures 2a and 2b, the trim cover 34 includes a deployment seam 38 for allowing the air bag 24 to deploy through the trim cover 34. The deployment seam 38 may be formed, for example, by joining two portions of the trim cover 34 together with breakable stitching or thread.

In addition, the seat back cushion assembly 16 includes an air bag deployment member or device 40 for guiding deployment of the air bag 24. While the deployment device 40 may have any suitable configuration, in the embodiment shown in Figure 2a, the deployment device 40 includes a flexible band that
5 circumscribes the air bag module 20 and extends through an opening 41 in padding 22 toward trim cover 34. As shown in Figure 2a, the deployment device 40 may also surround at least a portion of the frame 18. Moreover, the deployment device 40 may comprise any suitable material and have any suitable size. For example, the deployment device 40 may comprise fabric and/or plastic, and may have a width in
10 the range of 2 to 20 centimeters.

Referring to Figures 2a and 2b, the deployment device 40 may be connected to the trim cover 34 only on one side of the deployment seam 38. For example, the deployment device 40 may have a first end 42 connected to the trim cover 34 on an inboard side of the deployment seam 38, and a second end 44
15 directly and releasably connected to a portion 45 of the deployment device 40 proximate the first end 42. As a result, the deployment device 40 may be configured such that the second end 44 is not connected directly to the trim cover 34. While the deployment device 40 may be connected to the trim cover 34 and to itself in any suitable manner, in the embodiment shown in Figures 2a and 2b, the
20 first end 42 is sewn to the trim cover 34 with stitching or thread 46, and the second end 44 is sewn to the portion 45 with rupturable stitching or thread 47.

Alternatively, the deployment device 40 may be connected to the trim cover 34 on an outboard side of the deployment seam 38. For example, the second end 44 may be sewn or otherwise connected to the trim cover 34 proximate the
25 deployment seam 38, and the first end 42 may be sewn or otherwise connected to a portion of the deployment device 40 proximate the second end 42, such that the first end 42 is not directly connected to the trim cover 34.

Moreover, the deployment device 40 may be of a single piece construction, or the deployment device 40 may comprise multiple portions or
30 sections that are connected together, such as with fasteners, adhesive, thread, hook

and loop fastening systems and/or zippers. For example, the deployment device 40 may include first and second portions or sections 48 and 49, respectively, that extend along first and second sides 50 and 52, respectively, of the air bag module 20. In the embodiment shown in Figure 2a, the sections 48 and 49 are connected
5 together and to the frame 18 with one or more fasteners 54, such as push pin fasteners. As another example, the first and second sections 48 and 49 may be joined together by capturing the sections 48 and 49 between the frame 18 and the air bag module 20, such that the deployment device 40 does not surround the frame 18.

With the configuration described above, the deployment device 40
10 directs the air bag 24 toward the deployment seam 38 upon inflation of the air bag 24. When the air bag 24 is sufficiently close to the deployment seam 38, the thread 47 or other connection means breaks or otherwise releases to allow the ends 42 and 44 of the deployment device 40 to separate, thereby allowing the air bag 24 to rupture the deployment seam 38. Advantageously, deployment seam rupture times
15 of less than 5 milliseconds may be achieved with this configuration.

Alternatively or supplementally, the lower seat cushion assembly 14 may have a similar configuration as described above with respect to the seat back cushion assembly 16. More specifically, the lower seat cushion assembly 14 may be provided with an air bag module 20 and deployment device 40.

20 Figures 3a and 3b show a second embodiment 110 of a vehicle seat cushion assembly, such as a lower seat cushion assembly or a seat back cushion assembly, according to the invention. Similar components of the seat back cushion assembly 16 and cushion assembly 110 are identified with the same reference numerals.

25 The cushion assembly 110 includes an air bag module 112 having a housing 114 that surrounds air bag 24 and inflator 26. The housing 114 may be made of any suitable material, such as plastic, and includes first and second housing portions 116 and 118, respectively, that define first and second sides 120 and 122, respectively, of the air bag module 112. In addition, the housing portions 116 and

118 may be joined together by a rupturable portion 123, such as a frangible groove or seam. The housing portions 116 and 118 are configured to separate at the rupturable portion and move away from each other upon inflation of the air bag 24.

5 The cushion assembly 110 further includes an air bag deployment member or device 124 for guiding deployment of the air bag 24. The deployment device 124 includes first and second flexible sections 126 and 128, respectively, that are connected to the first and second housing portions 116 and 118, respectively, in any suitable manner. For example, the sections 126 and 128 may be connected to the housing portions 116 and 118 using fasteners and/or adhesive. In one
10 embodiment of the invention, each section 126 and 128 may be provided with a first engaging member, such as a hook, that engages a second engaging member, such as an aperture or recess, formed in a respective housing portion 116 and 118.

Alternatively, one or both sections 126 and 128 may be connected to any other suitable component. For example, one or both sections 126 and 128 may
15 be connected directly to seat frame 18, or to a bracket that is supported by frame 18.

In addition, the first section 126 is sewn or otherwise connected to the trim cover 34 on one side of the deployment seam 38, and the second section 128 is sewn or otherwise releasably connected directly to the first section 126 at a
20 location proximate the trim cover 34. For example, the first section 126 may be connected to the trim cover 34 with stitching or thread 130, and the second section 128 may be connected to the first section with breakable stitching or thread 132. Furthermore, in the embodiment shown in Figures 3a and 3b, the second section 128 is not connected directly to the trim cover 34. Although Figures 3a and 3b show the
25 first section 126 connected to the inboard side of deployment seam 38, the deployment device 124 may instead be connected to the outboard side of deployment seam 38.

Upon inflation of the air bag 24, the housing portions 116 and 118 separate and allow the air bag 24 to pass between the sections 126 and 128 of the
30 deployment device 124. The deployment device 124 directs the air bag 24 toward

the deployment seam 38, such that when the air bag 24 is sufficiently close to the deployment seam 38, the connection between the sections 126 and 128 breaks or otherwise releases. As a result, the sections 126 and 128 separate and allow the air bag 24 to rupture the deployment seam 38.

- 5 While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention.

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